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10/599,243	09/22/2006	Naoya Tamaki	NEC 04NPCT009	6175

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EXAMINER	
BALDRIDGE, BENJAMIN M	

ART UNIT	PAPER NUMBER
2831	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/599,243	TAMAKI ET AL.	
	Examiner	Art Unit	
	Benjamin M. Baldridge	2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1- 8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 4 ,6 - 7* is/are rejected.

7)☒ Claim(s) *1, 5 and 8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *13 November 2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL ACTION

1. Amendment A, received 7 April 2008, is acknowledged and entered into the record. Amended claims 1 – 8 are presented for examination.

Drawings

2. Applicant's argument concerning the objection previously made to Figure 7 has been considered, and is found persuasive. The objection to Figure 7 is withdrawn.

Specification

3. Applicant's amended abstract is acknowledged, and entered into the record.

Claim Objections

4. Applicant's amendment of claim 5 has remedied the informality objected to in a previous office action. The objection to claim 5 is withdrawn.

5. Claim 1 is objected to because of the following informalities:

Line 7: the phrase "setting the impedance of said variable impedance element substantially to 0" should specify a unit of measurement. For the purposes of examination, the phrase will be interpreted as "setting the impedance of said variable impedance element substantially to 0 Ohms (Ω)".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. Applicant's arguments regarding a previous rejection of claims 1 and 4 under 35 USC 112 for lack of enablement have been considered, and are found persuasive. Rejection of claims 1 and 4 under 35 USC 112 for lack of enablement is withdrawn.

Claim Rejections - 35 USC § 103

7. Claims 1 - 4, 6 - 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Agilent 8510C (Agilent 8510C Network Analyzer Data Sheet, Agilent Technologies, Inc., copyright 2002, 2006, Agilent Technologies, Inc., hereinafter referred to as Agilent), and further in view of Chheda et al. (US Patent 6,970,001 B2, November 29, 2005, hereinafter referred to as Chheda).

8. As to claim 1, Agilent discloses:

A terminal selected from said signal terminal and said ground terminal is used to measure the electrical characteristics of a measurement object (Page 13, Column 2, 8511A General Information – Input Ports, also Page 22, Test Set General Information Table, Impedance, DC bias. Note that the connector types specified on page 13 (3.5mm (f) and 2.4mm (f)) are coaxial microwave connectors consisting of a center pin and an outer shell, with a Teflon or air dielectric in between; note also that DC bias can be furnished to a circuit under test via the center conductor of the connectors, with the outer shell at ground potential, in order to furnish operating voltage or current to a device under test, as required).

said method comprising the steps of: setting the impedance of said variable impedance element substantially to 0, disconnecting the signal terminal and ground terminal of the probe at the distal end of said probe, forming a short circuit, and connecting a load to perform calibrations (Page 23, Calibration Kit descriptions; also Page 16, Column 2, Vector error correction techniques; note discussion of one port calibration, requiring three known standards, i.e. open, short and load terminations. Note also that calibration of the Agilent 8510C network analyzer consists of attaching each of the known standards to the input port of the analyzer, and commanding the network analyzer to execute the calibration procedure, storing the calibration constants and error correction information, which are then applied to measurements made thereafter);

Agilent does not disclose:

An electrical characteristics measurement method, wherein a probe comprising a single signal terminal, at least one ground terminal, and a variable impedance

element disposed in the vicinity of and in electrical communication with a terminal

Making the impedance of said variable impedance element to be greater than a prescribed value, and placing said signal terminal and said ground terminal in contact with said measurement object to measure the electrical characteristics thereof.

Chheda discloses:

An electrical characteristics measurement method, wherein a probe comprising a single signal terminal, at least one ground terminal, and a variable impedance element disposed in the vicinity of and in electrical communication with a terminal (Abstract, lines 1 – 7; note that a variable impedance probe is explicitly disclosed by Chheda in the abstract; note also disclosure of modifications, Column 8, lines 20 – 27, in which use as a single ended probe is discussed, which results in a probe with a single signal terminal, one ground terminal and a variable impedance element, as recited in the instant claim);

making the impedance of said variable impedance element to be greater than a prescribed value, and placing said signal terminal and said ground terminal in contact with said measurement object to measure the electrical characteristics thereof (Column 2, lines 50 – 55; note explicit mention of varying probe impedance to improve measurement accuracy).

Given the teaching of Chheda, a person of ordinary skill in the art would have readily recognized the desirability and advantages of modifying the method of Agilent by employing well known or conventional features such as a probe with a variable impedance, and setting the variable impedance greater than a prescribed value, as disclosed by Chheda, in order to make accurate electrical measurements in circuits and assemblies in production testing.

As to claim 2, Agilent fails to disclose:

The steps of: setting a parameter for evaluating the measurement error of the electrical characteristics of said measurement object, the parameter being set so that the measurement error becomes smaller as the value of the parameter decreases

Increasing the impedance of said variable impedance element until said parameter becomes equal to or less than an allowable value set in advance.

Chheda discloses:

the steps of: setting a parameter for evaluating the measurement error of the electrical characteristics of said measurement object, the parameter being set so that the measurement error becomes smaller as the value of the parameter decreases (Column 2, lines 21 – 25; note mention of enhanced accuracy of testing signal as object of one embodiment, with impedance mismatch as the parameter for evaluating the measurement error);

increasing the impedance of said variable impedance element until said parameter becomes equal to or less than an allowable value set in advance (Column 2, lines 50 – 55; note that Chheda explicitly discloses adjustment of the variable probe impedance until the impedance of a target conductive element or elements (i.e. the measurement object) is substantially matched.

Given the teaching of Chheda, a person of ordinary skill in the art would have readily recognized the desirability and advantages of modifying the method of Agilent by employing well known or conventional features such as a parameter for evaluating a measurement error, and increasing a variable impedance element until a parameter (i.e. an impedance mismatch) is reduced to an allowable value, as disclosed by Chheda, in order to make accurate electrical measurements in circuits and assemblies in production testing.

As to claim 3, Agilent discloses:

disconnecting and calibrating said signal terminal and said ground terminal in a location separated from peripheral objects (Page 16, Column 2, Vector error correction techniques; note explicit mention of calibration standards (short, open, various loads); note also that separation from peripheral objects in this context is construed as electrical separation, i.e. shielded from outside fields or currents. This is accomplished using calibration standards that mate to the various connector types available on an Agilent 8510C or similar instruments. An open circuit calibration, such as is routinely done on vector network analyzers such as an Agilent 8510C, is done with an open circuit termination that shields the port being calibrated from stray fields or currents. Note also that calibration of measurement instruments with known standards

is a common technique in RF and microwave circuit measurement, and is well known to persons of ordinary skill in those arts);

electrically conducting said signal terminal and said ground terminal to a single conductor to perform a short-circuit calibration (Page 16, Column 2, Vector error correction techniques; note explicit mention of short circuit standard);

electrically connecting said signal terminal and said ground terminal to a terminal of a 50Ω resistor to perform a loaded calibration (Page 16, Column 2, Vector error correction techniques; also note characteristic impedance of input and output ports, Page 13, Column 2, bottom. Terminations used in vector error correction, as listed on Page 16 (fixed, sliding and offset) are all 50Ω characteristic impedance loads; the fixed termination is made of a resistive material, trimmed or shaped to measure 50Ω precisely).

As to claim 4, Agilent discloses:

A measurement instrument (Page 2, Column 2, instrument description under heading "Excellence in Network Analysis"; note description of broadband measurement of magnitude, phase and group delay);

Agilent fails to disclose:

A probe that is connected to said measuring instrument and has a single signal terminal and at least one ground terminal

Said measurement device has a variable impedance element that is connected to said measuring instrument and is disposed in the vicinity of and in electrical communication with one terminal selected from said signal terminal and said ground terminal of said probe.

Chheda discloses:

a probe that is connected to said measuring instrument and has a single signal terminal and at least one ground terminal (Abstract, lines 1 – 7; Column 8, lines 20 – 28; note that one of the modifications to the disclosed probe can be used as a single ended probe, as disclosed in Column 8, lines 20 - 28);

said measurement device has a variable impedance element that is connected to said measuring instrument and is disposed in the vicinity of and in electrical communication with one terminal selected from said signal terminal and said ground terminal of said probe (Abstract, lines 1 – 7; Column 2, lines 30 – 35).

Given the teaching of Chheda, a person of ordinary skill in the art would have readily recognized the desirability and advantages of modifying the method of Agilent by employing well known or conventional features such as a probe with a single terminal and a ground terminal and a measurement device having a variable impedance element in electrical communication with a signal or ground terminal, as disclosed by Chheda, in order to make accurate electrical measurements in circuits and assemblies in production testing.

As to claim 6, Agilent discloses:

an input unit for inputting the allowable value of a parameter for evaluating the measurement error of the electrical characteristics of the measurement object (Page 3, System performance characteristics; note discussion of Calibration and Error correction in Column 2; Note also Pages 16 - 17, Vector error correction techniques, and discussion on page 17 of possible parameter adjustments);

a storage and computation unit for storing the impedance of said variable impedance element, the measurement values obtained from said probe, and the relational characteristics thereof, calculating a parameter for evaluating the measurement error from the relational characteristics, and comparing said parameter and said allowable value (Pages 5 – 7; Page 18, Columns 1 and 2, Storage; note measurement uncertainty data after calibration with different calibration standards, over various frequency ranges; note that cal data is stored in the instrument, and used to correct measurement data obtained from devices under test);

an output unit for outputting the results of said storage and computation unit (Page 17, Column 2, Display control; also Page 1, photograph of instrument in use; note instrument display showing waveform, a result of the storage and computation unit in the Agilent 8510C).

As to claim 7, Agilent discloses:

disconnecting and calibrating said signal terminal and said ground terminal in a location separated from peripheral objects (Page 16, Column 2, Vector error correction techniques; note explicit mention of calibration standards (short, open, various loads); see also discussion of meaning of "separated from peripheral objects" in claim 4, above);

electrically conducting said signal terminal and said ground terminal to a single conductor to perform a short-circuit calibration (Page 16, Column 2, Vector error correction techniques; note explicit mention of short circuit standard);

electrically connecting said signal terminal and said ground terminal to a terminal of a 50Ω resistor to perform a loaded calibration (Page 16, Column 2, Vector error correction techniques; also note characteristic impedance of input and output ports, Page 13, Column 2, bottom. Terminations used in vector error correction, as listed on Page 16 (fixed, sliding and offset) are all 50Ω characteristic impedance loads; the fixed termination is made of a resistive material, trimmed or shaped to measure 50Ω precisely).

Allowable Subject Matter

9. Claims 5 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

10. The following is a statement of reasons for the indication of allowable subject matter:

As to claim 5, the prior art of record fails to teach, singly or in combination, an electrical characteristics measurement device for measuring the electrical characteristics of a measurement object wherein:

the distance between said variable impedance element and the distal end of said signal terminal or said ground terminal as one of the terminals provided with said variable impedance element is within approximately 1/10 or less the measuring wavelength when the electrical characteristics of said measurement object are measured.

Response to Arguments

11. Applicant's arguments, see Amendment A, filed 7 April, 2008, with respect to the rejection(s) of amended claim(s) 1 and 4 under 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon

further consideration, a new ground(s) of rejection is made in view of Chheda, as discussed above in paragraph 8.

As to amended claim 1, Chheda discloses:

said measurement device has a variable impedance element that is connected to said measuring instrument and is disposed in the vicinity of and in electrical communication with one terminal selected from said signal terminal and said ground terminal of said probe (Abstract, lines 1 – 7; Column 2, lines 30 – 35).

As to amended claim 4, Chheda discloses:

said measurement device has a variable impedance element that is connected to said measuring instrument and is disposed in the vicinity of and in electrical communication with one terminal selected from said signal terminal and said ground terminal of said probe (Abstract, lines 1 – 7; Column 2, lines 30 – 35).

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin M. Baldridge whose telephone number is 571 270 1476. The examiner can normally be reached on Monday through Friday 7:30AM to 5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571 272 2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Vincent Q. Nguyen/
Primary Examiner, Art Unit 2831

/Benjamin M Baldridge/
Examiner, Art Unit 2831